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EXAMINER	
STOFFREGEN, JOEL	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/813,208	AUE ET AL.	
	Examiner	Art Unit	
	Joel Stoffregen	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/06/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to the original application filed on 03/30/2004.

Claims 1-38 are currently pending in this application. Claims 1, 23 and 30 are independent claims.

Information Disclosure Statement

2. The examiner has considered the information disclosure statement (IDS) submitted on 07/06/2004.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 30-38** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite a computer program product implementing a method. A program causing a computer to execute a method that is not tangibly embodied on a computer readable medium is non-statutory subject matter.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1, 2, 7, 8, and 16-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Menezes et al., Publication No: US 2003/0023422 ("MENEZES").

7. Regarding **claim 1**, MENEZES teaches a method of decoding an input semantic structure to generate an output semantic structure, the method comprising:

providing a set of transfer mappings ("transfer mapping database 218", paragraph [0057]);

calculating a score for at least one transfer mapping in the set of transfer mappings ("the set of best matches is found based on a predetermined metric", paragraph [0066]) using a statistical model (see p. 9, Table 1);

selecting at least one transfer mapping based on the score ("the subset of matching transfer mappings is selected", paragraph [0121]); and

using the selected transfer mapping to construct the output semantic structure ("the transfer mappings in the subset are combined into a transfer logical form from which the output text is generated", paragraph [0121]).

8. Regarding **claim 2**, MENEZES further teaches that providing a set of transfer mappings comprises providing a set of transfer mappings ("transfer mapping database 218", paragraph [0057]), each transfer mapping having an input semantic side that describes nodes of the input semantic structure and having an output semantic side that

describes nodes of the output semantic structure ("composed of a pair of logical form fragments, including a source and target logical form", paragraph [0008]).

9. Regarding **claim 7**, MENEZES further teaches that calculating a score for at least one transfer mapping comprises calculating a size score based on a number of nodes in the input semantic side of the transfer mapping (see p. 9, Table 1, "size of transfer mapping matched").

10. Regarding **claim 8**, MENEZES further teaches that calculating a score for at least one transfer mapping comprises calculating a rank score based on a number of matching binary features in the input semantic structure and the input semantic side of the transfer mapping (see p. 9, Table 1, "frequency with which the transfer mapping was generated from fully aligned logical forms").

11. Regarding **claim 16**, MENEZES further teaches that providing a set of transfer mappings comprises providing a set of transfer mappings arranged as a tree structure comprising a root transfer mapping and subtrees, each subtree comprising a root transfer mapping, wherein each transfer mapping in the set of transfer mappings appears as a root transfer mapping in at least one of the tree and subtrees (see FIG. 5B and and FIG. 8).

12. Regarding **claim 17**, MENEZES further teaches that providing a set of transfer mappings as a tree structure comprises providing multiple levels of nested subtrees (see FIG. 5B).

13. Regarding **claim 18**, MENEZES further teaches that calculating a score for at least one transfer mapping comprises calculating a score for a tree of transfer mappings through steps comprises:

recursively calculating a score for each level of nested subtrees, wherein calculating a score for a subtree comprises recursively scoring the subtrees of the subtree ("a pair of child nodes, one from each logical form, having a tentative correspondence with each other, are aligned", paragraph [0093]), calculating a score for the root transfer mapping of the subtree ("a parent node of each respective child node is already aligned", paragraph [0093]), and combining the scores for the subtrees of the subtree with the score for the root transfer mapping of the subtree ("an alignment score assigned to the transfer mapping by the alignment component", p. 9, table 1);

calculating a score for the root transfer mapping ("a pair of parent nodes, one from each logical form, having a tentative correspondence with each other, are aligned", paragraph [0092]); and

combining the score for each subtree with the score for the root transfer mapping ("an alignment score assigned to the transfer mapping by the alignment component", p. 9, table 1).

14. Regarding **claim 19**, MENEZES further teaches that computing a score for a root transfer mapping comprises computing a size score for the root transfer mapping based on a number of nodes in the input semantic side of the root transfer mapping (see p. 9, Table 1, "size of transfer mapping matched").

15. Regarding **claim 20**, MENEZES further teaches combining the score of subtrees with the score for a root transfer mapping comprises combining size scores for the subtrees with the size score for the root transfer mapping by averaging the size scores for the subtrees with the size score for the root transfer mapping (see p. 9, Table 1, "size of transfer mapping matched").

16. Regarding **claim 21**, MENEZES further teaches that computing a score for a root transfer mapping comprises computing a rank score for the root transfer mapping based on a number of matching binary features in the input semantic structure and the input semantic side of the root transfer mapping (see p. 9, Table 1, "frequency with which the transfer mapping was generated from fully aligned logical forms").

17. Regarding **claim 22**, MENEZES further teaches that combining the score of subtrees with the score for a root transfer mapping comprises combining rank scores for the subtress with the rank score of the root transfer mapping by averaging the rank scores for the subtrees with the rank score of the root transfer mapping (see p. 9, Table

1, "frequency with which the transfer mapping was generated from fully aligned logical forms").

18. Regarding **claim 23**, MENEZES teaches a machine translation system for translating an input in a first language into an output in a second language, the system comprising:

a parser for parsing the input into an input semantic representation (see FIG. 2A, block 204);

a search component configured to find a set of transfer mappings, wherein each transfer mapping corresponds with a portion of the input semantic representation ("when a plurality of transfer mappings in a transfer mapping database match the input logical form", paragraph [0007]);

a decoding component configured to score a plurality of transfer mappings and to select at least one transfer mapping based on the scores ("one or more of those plurality of matching transfer mappings is selected based on a predetermined metric", paragraph [0007]); and

a generation component configured to generate the output based on the selected transfer mapping ("the transfer mappings in the subset are combined into a transfer logical form from which the output text is generated", paragraph [0121]).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. **Claims 3-6, 9-15, and 24-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Menezes et al., Publication No: US 2003/0023422 ("MENEZES") in view of Brown et al., Patent No. US 5,477,451 ("BROWN").

21. Regarding **claim 3**, MENEZES teaches all of the claimed limitations of claim 1. However, MENEZES does not disclose that calculating a score for at least one transfer mapping comprises calculating a score using a target language model that provides a probability of a set of nodes appearing in the output semantic structure.

In the same field of translation, BROWN teaches that calculating a score for at least one transfer mapping comprises calculating a score using a target language model that provides a probability of a set of nodes appearing in the output semantic structure ("structure language model 204 which assigns a probability or score P(E') to any intermediate structure E'", BROWN, column 8, lines 48-50).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the probability models of BROWN with the translation system of MENEZES in order to better combine information acquired from different sources (BROWN, column 2, lines 35-37).

22. Regarding **claim 4**, MENEZES and BROWN further teach that calculating a score for at least one transfer mapping comprises calculating a score using a channel model that provides a probability of an input semantic side of a transfer mapping given the output semantic side of the transfer mapping ("assigns a conditional probability or score P(F'|E') to any intermediate structure F' given any intermediate structure E'", BROWN, column 8, lines 52-54).

23. Regarding **claim 5**, MENEZES and BROWN further teach that calculating a score using the channel model comprises normalizing a channel model score based on a number of overlapping nodes between transfer mappings ("of the ones that overlap, we can only use those that are 'compatible' with one another", MENEZES, paragraph [0136]).

24. Regarding **claim 6**, MENEZES and BROWN further teach that calculating a score for at least one transfer mapping comprises calculating a score using a fertility model that provides a probability of node deletion in a transfer mapping ("the parameters of Model 3 are thus a set of fertility probabilities", BROWN, column 52, lines 35-36).

25. Regarding **claim 9**, MENEZES and BROWN further teach that calculating a score for at least one transfer mapping in the set of transfer mappings comprises:

computing separate scores for a plurality of models ("hypotheses are scored by two different models", BROWN, abstract); and

combining the separate scores to determine the score for the transfer mapping ("scores from the translation model and language model are combined into a combined score", BROWN, abstract).

26. Regarding **claim 10**, MENEZES and BROWN further teach that the plurality of models comprises a channel model that provides a probability of an input semantic side of a transfer mapping given the output semantic side of the transfer mapping ("assigns a conditional probability or score P(F'|E') to any intermediate structure F' given any intermediate structure E'", BROWN, column 8, lines 52-54).

27. Regarding **claim 11**, MENEZES and BROWN further teach that the plurality of models comprises a fertility model that provides a probability of node deletion in a transfer mapping ("the parameters of Model 3 are thus a set of fertility probabilities", BROWN, column 52, lines 35-36).

28. Regarding **claim 12**, MENEZES and BROWN further teach that the plurality of models comprises a target language model that provides a probability of a set of nodes appearing in the output semantic structure ("structure language model 204 which assigns a probability or score P(E') to any intermediate structure E'", BROWN, column 8, lines 48-50).

29. Regarding **claim 13**, MENEZES and BROWN further teach:

computing a size score for the transfer mapping, the size score based on a number of nodes in the input semantic side of the transfer mapping (see MENEZES, p. 9, Table 1, "size of transfer mapping matched"); and

combining the size score with the separate scores for the plurality of models to determine the score for the transfer mapping ("additional information can be used to choose an appropriate set of mappings", MENEZES, paragraph [0119]).

30. Regarding **claim 14**, MENEZES and BROWN further teach:

computing a rank score for the transfer mapping, the rank score based on a number of matching binary features in the input semantic structure and the input semantic side of the transfer mapping (see MENEZES, p. 9, Table 1, "frequency with which the transfer mapping was generated from fully aligned logical forms"); and

combining the rank score with the separate scores for the plurality of models to determine the score for the transfer mapping ("additional information can be used to choose an appropriate set of mappings", MENEZES, paragraph [0119]).

31. Regarding **claim 15**, MENEZES and BROWN further teach that combining the scores comprises:

multiplying each score by a weight to form weighted model scores (see BROWN, column 32, equation 7, each probability is weighted by λ); and

summing the weighted model scores to determine the score for each transfer mapping (see BROWN, column 32, equation 7, the weighted probabilities are summed to create a smoothed model).

32. Regarding **claim 24**, MENEZES teaches all of the claimed limitations of claim 23. However, MENEZES does not disclose that the decoding component scores each transfer mapping by using a plurality of statistical models.

In the same field of translation, BROWN teaches that the decoding component scores each transfer mapping by using a plurality of statistical models ("hypotheses are scored by two different models", BROWN, abstract).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the probability models of BROWN with the translation system of MENEZES in order to better combine information acquired from different sources (BROWN, column 2, lines 35-37).

33. Regarding **claim 25**, MENEZES and BROWN further teach that the output comprises an output semantic representation ("transfer logical form", MENEZES, paragraph [0121]) and wherein the plurality of statistical models comprises a target model that provides a probability of a sequence of nodes appearing in the output semantic representation ("structure language model 204 which assigns a probability or score P(E') to any intermediate structure E'", BROWN, column 8, lines 48-50).

34. Regarding **claim 26**, MENEZES and BROWN further teach that the plurality of statistical models comprises a channel model that provides a probability of a set of semantic nodes in an input side of a transfer mapping given a set of semantic nodes in an output side of the transfer ("assigns a conditional probability or score P(F'|E') to any intermediate structure F' given any intermediate structure E'", BROWN, column 8, lines 52-54).

35. Regarding **claim 27**, MENEZES and BROWN further teach that the plurality of statistical models comprises a fertility model that provides a probability of a node deletion in the transfer mapping ("the parameters of Model 3 are thus a set of fertility probabilities", BROWN, column 52, lines 35-36).

36. Regarding **claim 28**, MENEZES and BROWN further teach that the decoding component scores each transfer mapping using a size score based on a number of nodes in an input side of the transfer mapping (see MENEZES, p. 9, Table 1, "size of transfer mapping matched").

37. Regarding **claim 29**, MENEZES and BROWN further teach that the decoding component scores each transfer mapping using a rank score based on a number of matching binary features between the input and an input side of the transfer mapping (see MENEZES, p. 9, Table 1, "frequency with which the transfer mapping was generated from fully aligned logical forms").

38. Regarding **claim 30**, MENEZES teaches a computer-implemented method of determining a score for a word string, the method comprising:

computing a semantic structure having a plurality of nodes that relate to the word string ("an input logical form is generated based on the textual input", MENEZES, paragraph [0007]).

However, MENEZES does not disclose scoring the word string with a target language model that provides a probability of sequences of nodes in the semantic structure to score the word string.

In the same field of translation, BROWN teaches scoring the word string with a target language model that provides a probability of sequences of nodes in the semantic structure to score the word string ("language model which assigns a probability or score to an intermediate target structure", BROWN, abstract).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the probability models of BROWN with the translation system of MENEZES in order to better combine information acquired from different sources (BROWN, column 2, lines 35-37).

39. Regarding **claim 31**, MENEZES and BROWN further teach that providing a semantic structure having a plurality of nodes comprises providing a semantic structure having a plurality of word nodes and at least one relationship node that describes a semantic relationship between words (see MENEZES, FIG. 3).

40. Regarding **claim 32**, MENEZES and BROWN further teach that providing word nodes comprises providing word nodes for lemmas ("words in the sentences are converted to normalized word forms [lemmas]", MENEZES, paragraph [0059]).

41. Regarding **claim 33**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target language model in machine translation ("batch translation system", BROWN, column 9, line 41).

42. Regarding **claim 34**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target language model in speech recognition ("speech recognition system", BROWN, column 12, lines 53).

43. Regarding **claim 35**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target language model in optical character recognition ("output of an optical scanner", BROWN, column 12, line 52).

44. Regarding **claim 36**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target

language model in grammar checking ("construction of syntactic classes or words", BROWN, column 33, line 60).

45. Regarding **claim 37**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target language model in handwriting recognition ("output of an optical scanner", BROWN, column 12, line 52).

46. Regarding **claim 38**, MENEZES and BROWN further teach that scoring the word string with a target language model comprises scoring the word string with the target language model in information extraction ("combining information acquired from different sources", BROWN, column 2, lines 36-37).

Conclusion

47. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. A list of the pertinent prior art can be found on the included form PTO-892 Notice of References Cited.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel Stoffregen whose telephone number is (571) 270-1454. The examiner can normally be reached on Monday - Friday, 9:00 a.m. - 6:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS

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